

AIR FORCE QUALIFICATION TRAINING PACKAGE (AFQTP)



for
**ELECTRICAL POWER PRODUCTION
(3E0X2)**

**MODULE 26
GROUNDING FUNDAMENTALS**

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Career Field Education and Training Plan (CFETP) references from 1 Apr 97 version.

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Notice. This AFQTP is NOT intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

AIR FORCE QUALIFICATION TRAINING PACKAGES
for
ELECTRICAL POWER PRODUCTION
(3E0X2)

INTRODUCTION

Before starting this AFQTP, refer to and read the “Trainee/Trainer Guide” located on the AFCESA Web site <http://www.afcesa.af.mil/>

AFQTPs are mandatory and must be completed to fulfill task knowledge requirements on core and diamond tasks for upgrade training. *It is important for the trainer and trainee to understand* that an AFQTP does not replace hands-on training, nor will completion of an AFQTP meet the requirement for core task certification. AFQTPs will be used in conjunction with applicable technical references and hands-on training.

AFQTPs and Certification and Testing (CerTest) must be used as minimum upgrade requirements for Diamond tasks.

MANDATORY minimum upgrade requirements:

Core task:

AFQTP completion
Hands-on certification using the included Performance Checklist

Diamond task:

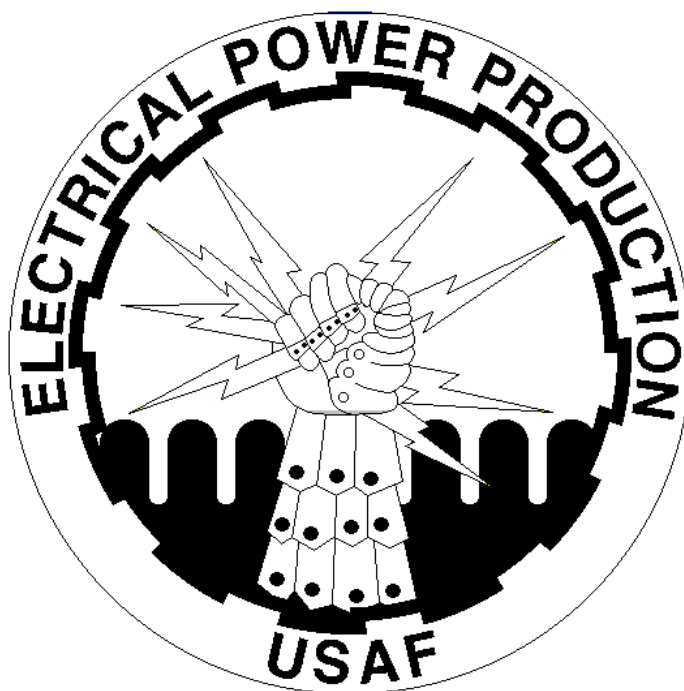
AFQTP completion
CerTest completion (80% minimum to pass)

Note: *Trainees will receive hands-on certification using the included Performance Checklist for Diamond Tasks when equipment becomes available either at home station or at a TDY location.*

Put this package to use. Subject matter experts under the direction and guidance of HQ AFCESA/CEOT revised this AFQTP. If you have any recommendations for improving this document, please contact the Career Field Manager at the address below.

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GROUNDING FUNDAMENTALS

MODULE 26

AFQTP UNIT 2

INSTALLATION (26.2.)

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INSTALLATION

Task Training Guide

STS Reference Number/Title:	26.2., Installation
Training References:	<ul style="list-style-type: none"> • CD-ROM, (Grounding Fundamentals)
Prerequisites:	<ul style="list-style-type: none"> • Possess as a minimum a 3E032 AFSC
Equipment/Tools Required:	<ul style="list-style-type: none"> • General tool kit • Safety equipment • Grounding kit • 6 AWG wire • Generator
Learning Objective:	<ul style="list-style-type: none"> • Identify facts and terms pertaining to the installing an electrical grounding system • Install a system ground
Samples of Behavior:	<ul style="list-style-type: none"> • Identify parts, tools, and basic facts pertaining to the installation of grounding systems • Identify step necessary to install ground rods • Trainee will demonstrate proper grounding procedures
Notes:	
	<ul style="list-style-type: none"> •

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GROUNDING FUNDAMENTALS

Background: Distribution system grounds are very important. They allow fuses and other system safety components to operate properly. The most elaborate grounding system you can design may prove ineffective unless the connection of the system to earth is adequate and has a sufficiently low resistance. For safety reasons, electric power systems and equipment are intentionally grounded so that insulation failure results in operation of protective devices to de-energize circuits, thus reducing risk to personnel. The word grounding is used commonly in electric power system work to cover both system grounding and equipment grounding; however, the distinction between system and equipment grounding should be recognized.

A system ground is a connection to ground from one of the conductors of an electric circuit, normally the neutral conductor. The purpose of electrical system grounds is to stabilize voltage to ground and give a low impedance path for fault current. Equipment grounding involves interconnecting and connecting to earth all noncurrent carrying metal parts of an electrical wiring system and equipment connected to the system. The equipment ground is connected to an electrical system ground (neutral) only at the service entrance of a building and should not exceed 25 ohms to ground. The purpose of grounding equipment is to ensure personnel safety, by reducing any charge in an equipment item to near zero volts with respect to ground, without causing a fire or explosive hazard, until the circuit protective device clears the fault.

To accomplish this lesson, complete: CD-ROM 3E0X2-26 (Grounding Fundamentals).

NOTE: After completing all the lessons you may see your Unit Education and Training Manager to take the following optional Certest:

Test no.
8087

Title
Grounding Fundamentals

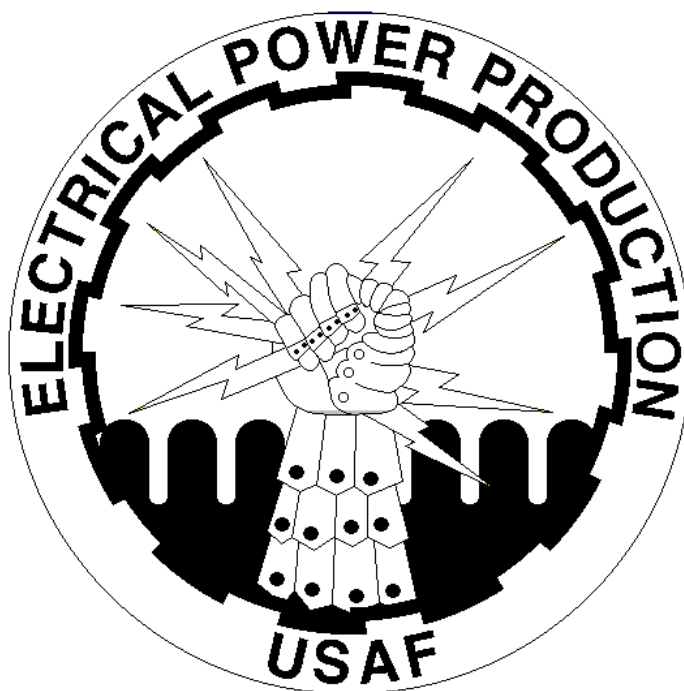
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GROUNDING FUNDAMENTALS

Performance Checklist		
Step	Yes	No
1. Stated the types of grounding installations		
2. Followed safety procedures		
3. Properly installed ground rods		
4. Properly connected grounding conductor to equipment and ground rod		
5. Used the proper size wire		
6. Demonstrated overall proper grounding procedures		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

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GROUNDING FUNDAMENTALS

MODULE 26

AFQTP UNIT 3

TESTING (26.3.)

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TESTING***Task Training Guide***

STS Reference Number/Title:	26.3., Testing
Training References:	<ul style="list-style-type: none"> • CD-ROM, (Grounding Fundamentals)
Prerequisites:	<ul style="list-style-type: none"> • Possess as a minimum a 3E032 AFSC
Equipment/Tools Required:	<ul style="list-style-type: none"> • Vibroground • Multimeter • Standard tool box
Learning Objective:	<ul style="list-style-type: none"> • Safely test a systems ground using different methods and procedures
Samples of Behavior:	<ul style="list-style-type: none"> • Describe the different methods of testing system grounds • Safely test a system ground
Notes:	
<ul style="list-style-type: none"> • To successfully complete this element follow the steps outlined in the applicable technical manual exactly--no exceptions. • Any safety violation is an automatic failure. 	

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GROUNDING FUNDAMENTALS

Background: Installing grounding system is a laborious and tedious task however, if the system has not been tested, you don't know if it is effective. Therefore, testing is essential to proper grounding. There are many different methods used to test a grounding system, the use of a vibro-ground, or a 'simple test' are just two examples. All in all you need a fall-of-potential meter to measure system-to-ground resistance and a digital ohmmeter for component continuity checks. Be sure to use instruments designed specifically for measuring the resistance of earth-ground systems. The instruments must be able to measure 10 ohms (plus or minus 10 percent) for ground resistance tests and 1 ohm (plus or minus 10 percent) for continuity testing. Be sure to follow the manufacturer's instruction manual when using the instruments (except as modified under "test procedures").

To accomplish this lesson, complete: CD-ROM 3E0X2-26 (Grounding Fundamentals).

NOTE: After completing all the lessons you may see your Unit Education and Training Manager to take the following optional Certest:

<u>Test no.</u>	<u>Title</u>
8087	Grounding Fundamentals

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GROUNDING FUNDAMENTALS

Performance Checklist		
Step	Yes	No
1. Stated different methods to test a ground		
2. Stated the minimum OHMS value for types of grounds		
3. Ensured proper ground connection		
4. Used proper safety equipment		
5. Performed ground test		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

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